

WHAT IS CLAIMED IS:

1. A drive circuit for use in a liquid crystal display, said drive circuit supplying source signal from a source driver to pixel electrodes through switching by means of thin film transistors according to scan signals from a gate driver,

    said drive circuit comprising adjusting means for adjusting potential differences between the pixel electrodes and a common electrode,

    wherein

    the adjusting means is composed of voltage level altering means for shifting voltage levels of the source signals supplied by the source driver equally for all the pixel electrodes.

2. The drive circuit as defined in claim 1, wherein

    the adjusting means adjusts the potential differences between the pixel electrodes and the common electrode to compensate for effects of variations in drain voltages caused by parasitic capacity in the thin film transistors.

3. The drive circuit as defined in claim 1, wherein

    when the pixel electrodes are made of a plurality of

kinds of metal film layers, the adjusting means adjusts the potential differences between the pixel electrodes and the common electrode to compensate for irregularities in DC voltage component between drains of the thin film transistors and one of the plurality of kinds of metal film layers that constitutes the pixel electrodes electrically connected to the drains and that is located closer to a liquid crystal layer than the other metal film(s).

4. The drive circuit as defined in claim 1, wherein the adjusting means adjusts the potential differences between the pixel electrodes and the common electrode to compensate for irregularities in DC voltage caused by asymmetry in properties between an active matrix substrate and an opposite substrate sandwiching a liquid crystal layer.

5. The drive circuit as defined in claim 1, wherein the voltage level altering means is provided in reference voltage generator means for producing source driver reference voltages from which the source driver produces the voltage levels of the source signals and is composed of: voltage divider means for producing and supplying the source driver reference voltages by voltage

division of a difference between high and low reference voltages; high-and-low-reference-voltage-interconnecting means for altering the high and low reference voltages in an interconnected manner; and low-reference-voltage-specifying means for specifying a ratio of the low reference voltage to the high reference voltage.

6. The drive circuit as defined in claim 1, wherein the voltage divider means is capable of producing a plurality of mutually different sets of voltages as the source drive reference voltages and selectively supplying one of the sets as outputs.

7. The drive circuit as defined in claim 5, wherein the high-and-low-reference-voltage-interconnecting means is composed of: an adder circuit including an OP-amplifier for adding two sets of produced voltages with each other to supply the high reference voltage as an output; and a subtractor circuit including an OP-amplifier for subtracting the two sets of produced voltages with each other to the low reference voltage as an output.

8. The drive circuit as defined in claim 5, wherein the high-and-low-reference-voltage-interconnecting

means is composed of a first inverter-amplifier circuit including an OP-amplifier for supplying as an output the low reference voltage from two sets of produced voltages and a second inverter-amplifier circuit including an OP-amplifier for supplying as an output the high reference voltage from the two sets of produced voltages.

9. The drive circuit as defined in claim 5, wherein the high-and-low-reference-voltage-interconnecting means is composed of: a low-reference-voltage-producing D/A conversion circuit for receiving DC level adjustment data and supplying the low reference voltage as an output; a digital adder circuit for adding the high-and-low-reference-voltage-level-difference-specifying data with the DC level adjustment data; and an high-reference-voltage-producing D/A conversion circuit for receiving the addition data supplied by the digital adder circuit and supplying the high reference voltage as an output.

10. The drive circuit as defined in claim 1, further comprising common electrode signal generator means including switching means only for switching between the ground potential and the positive power source to provide a fixed potential to the common electrode.

11. The drive circuit as defined in claim 10, wherein  
the common electrode signal generator means is built  
in the source driver.

12. A liquid crystal display, comprising a drive circuit  
for use in a liquid crystal display,

    said drive circuit supplying source signals from a  
source driver to pixel electrodes through switching by  
means of thin film transistors according to scan signals  
from a gate driver,

    said drive circuit including adjusting means for  
adjusting potential differences between the pixel  
electrodes and a common electrode,

    wherein

    the adjusting means is composed of voltage level  
altering means for shifting voltage levels of the source  
signals supplied by the source driver equally for all the  
pixel electrodes.

13. The liquid crystal display as defined in claim 12,  
wherein

    the voltage level altering means is provided in  
reference voltage generator means for producing source  
driver reference voltages from which the source driver  
produces the voltage levels of the source signals and is

composed of: voltage divider means for producing and supplying the source driver reference voltages by voltage division of a difference between high and low reference voltages; high-and-low-reference-voltage-interconnecting means for altering the high and low reference voltages in an interconnected manner; and low-reference-voltage-specifying means for specifying a ratio of the low reference voltage to the high reference voltage.

14. The liquid crystal display as defined in claim 13, wherein

the voltage divider means is capable of producing a plurality of mutually different sets of voltages as the source drive reference voltages and selectively supplying one of the sets as outputs.

15. The liquid crystal display as defined in claim 13, wherein

the high-and-low-reference-voltage-interconnecting means is composed of: an adder circuit including an OP-amplifier for adding two sets of produced voltages with each other to supply the high reference voltage as an output; and a subtractor circuit including an OP-amplifier for subtracting the two sets of produced voltages with each other to supply the low reference

voltage as an output.

16. The liquid crystal display as defined in claim 13,  
wherein

the high-and-low-reference-voltage-interconnecting  
means is composed of a first inverter-amplifier circuit  
including an OP-amplifier for supplying as an output the  
low reference voltage from two sets of produced voltages  
and a second inverter-amplifier circuit including an OP-  
amplifier for supplying as an output the high reference  
voltage from the two sets of produced voltages.

17. The liquid crystal display as defined in claim 13,  
wherein

the high-and-low-reference-voltage-interconnecting  
means is composed of: a low-reference-voltage-producing  
D/A conversion circuit for receiving DC level adjustment  
data and supplying the low reference voltage as an  
output; a digital adder circuit for adding the high-and-  
low-reference-voltage-level-difference-specifying data  
with the DC level adjustment data; and an high-reference-  
voltage-producing D/A conversion circuit for receiving  
the addition data supplied by the digital adder circuit  
and supplying the high reference voltage as an output.

18. The liquid crystal display as defined in claim 12, said drive circuit further including common electrode signal generator means including switching means only for switching between the ground potential and the positive power source to provide a fixed potential to the common electrode.

19. The liquid crystal display as defined in claim 18, wherein

the common electrode signal generator means is built in the source driver.

20. The liquid crystal display as defined in claim 12, wherein

the liquid crystal display is one of reflective, opaque, reflective/transparent, or transparent types.

21. Electronics, comprising a liquid crystal display including a drive circuit for use in a liquid crystal display,

said drive circuit supplying source signals from a source driver to pixel electrodes through switching by means of thin film transistors according to scan signals from a gate driver,

said drive circuit including adjusting means for

adjusting potential differences between the pixel electrodes and a common electrode,

wherein

the adjusting means is composed of voltage level altering means for shifting levels of the voltage levels of the source signals supplied by the source driver equally for all the pixel electrodes.

22. The electronics as defined in claim 21, wherein the voltage level altering means is provided in reference voltage generator means for producing source driver reference voltages from which the source driver produces the voltage levels of the source signals and is composed of: voltage divider means for producing and supplying the source driver reference voltages by voltage division of a difference between high and low reference voltages; high-and-low-reference-voltage-interconnecting means for altering the high and low reference voltages in an interconnected manner; and low-reference-voltage-specifying means for specifying a ratio of the low reference voltage to the high reference voltage.

23. The electronics as defined in claim 22, wherein the voltage divider means is capable of producing a plurality of mutually different sets of voltages as the

source drive reference voltages and selectively supplying one of the sets as outputs.

24. The electronics as defined in claim 22, wherein the high-and-low-reference-voltage-interconnecting means is composed of: an adder circuit including an OP-amplifier for adding two sets of produced voltages with each other to supply the high reference voltage as an output; and a subtractor circuit including an OP-amplifier for subtracting the two sets of produced voltages with each other to supply the low reference voltage as an output.

25. The electronics as defined in claim 22, wherein the high-and-low-reference-voltage-interconnecting means is composed of a first inverter-amplifier circuit including an OP-amplifier for producing as an output the low reference voltage from two sets of produced voltages and a second inverter-amplifier circuit including an OP-amplifier for producing as an output the high reference voltage from the two sets of produced voltages.

26. The electronics as defined in claim 22, wherein the high-and-low-reference-voltage-interconnecting means is composed of: a low-reference-voltage-producing

D/A conversion circuit for receiving DC level adjustment data and supplying the low reference voltage as an output; a digital adder circuit for adding the high-and-low-reference-voltage-level-difference-specifying data with the DC level adjustment data; and an high-reference-voltage-producing D/A conversion circuit for receiving the addition data supplied by the digital adder circuit and supplying the high reference voltage as an output.

27. The electronics as defined in claim 21,

      said driver circuit further including common electrode signal generator means including switching means only for switching between the ground potential and the positive power source to provide a fixed potential to the common electrode.

28. The drive circuit for use in a liquid crystal display as defined in claim 27, wherein

      the common electrode signal generator means is built in the source driver.

29. The electronics as defined in claim 21, wherein

      the liquid crystal display is one of reflective, opaque, reflective/transparent, or transparent types.

30. The electronics as defined in claim 21, wherein  
the electronics include a mobile telephone, a  
personal data assistant, a notebook personal computer, a  
portable television set, and a portable game machine.